

Please amend claims 56 and 57, and add new claims 64 and 65, as shown on the attached separate "claim sheets marked up to show changes" and the enclosed separate "clean set of claims."

REMARKS

Claims 56, 57, 62, 64 and 65 are in the application. Reconsideration and withdrawal of the rejections is requested in view of the foregoing amendments and the following remarks.

See 'A'
Dol In response to paragraph 1 of the 11/09/00 Office Action, Applicant has reviewed the application papers and finds no reference to Serial No. 08/845,662. The applications listed in the Preliminary Amendment mailed May 22, 2000 appear to be correct.

Claim 56 has been amended to overcome the 35 U.S.C. 132 and 112 rejections, and to further distinguish over the prior art. Regarding the 35 U.S.C. 132 rejection on the generic "workpiece," the specification, at page 1, lines 8-10 refers to the "workpieces" as "semiconductor wafers, data disks, semiconductor substrates and similar articles requiring very low contaminant levels." The Examiner is correct that the specification does not use the word "workpiece." The claims as amended in the Preliminary Amendment use "workpiece" as a generic description of "semiconductor wafers, data disks, semiconductor substrates and similar articles requiring very low contaminant levels" because there is no word generically describing this collection of workpieces. Nevertheless, in view of the objection at paragraph 4 of the Office Action, the term "workpiece" in the claims has been changed to "article" (as referenced at page 1, line 9), and the preamble of the independent claims refers to processing a "semiconductor wafer, data disk, semiconductor substrate and similar articles requiring very low contaminant levels".

In further response to paragraph 4 of the Office Action, in Figures 41-49 of the application, element 45 is the enclosure envelope, as described at page 6, line 17, and as also shown in Figure 1. The container operator 608, which forms part of the docking station is within the enclosure 45. While the upper wall 45 in Figure 41-49 may be somewhat ambiguous, the loading subsystem 600 is clearly within the lower enclosure 45. Moreover, from the description provided at pages 52 and 53 of the application, the person of ordinary skill would understand that the sealed container 602 is unsealed within the clean environment within the enclosure 45, rather than outside of the enclosure 45. Accordingly, Applicant submits that the initial steps in claim 56 objected to in paragraph 4 of the Office Action do not include any new matter. Regardless, claim 56 has been amended to delete the step of "moving the sealed container from the interface port to a docking station" and to also delete the description of unsealing the container "at the docking station."

*But the
interface
port is
element
609
sel
p 55
1,10-16*

Turning to the rejection of claim 61 at paragraph 4 of the Office Action, although it is believed that Figures 41 and 42 show the claimed vertical movement of the container, claim 61 has been cancelled, thereby obviating the rejection.

In view of the foregoing, Applicant submits that each of the objections in paragraph 4 of the Office Action has been overcome.

Turning to the objection to the drawings in paragraph 3 of the Office Action, claim 63 intended to state "moving the workpiece laterally" rather than "moving a carriage holding the workpiece laterally." As claim 63 has been cancelled, the objection is paragraph 3 of the Office Action is overcome.

The foregoing changes to the claims discussed in reference to paragraph 4 are also believed to overcome the 35 U.S.C. § 112, 2nd paragraph, rejections at paragraph 8 of the Office Action.

In addition to replacing “workpiece” with “article” in the claims, and to deleting the subject matter objected to as new matter, claim 56 has been further amended as follows:

The last line of claim 56 has been completed with the addition of “chamber.” At line 8 of claim 56, “moving the workpiece” has been changed to “pivoting the engagement head to move the article,” thereby merging the content of cancelled claim 58 into Claim 56.

The additional step of “releasing the article from the engagement head” has been inserted in-between lines 8 and 9, thereby merging the content of cancelled claim 59 into claim 56. At line 13 of Claim 56, “with the article in the vertical orientation” has been added at the end of the line.

Claim 57 has been amended to delete reference to the docking station within the enclosure and the steps of opening and closing the interface port, and to add that the interface port is part of a processing system.

Claims 58-61 and 63 have been cancelled.

New Claim 64 describes the engagement head pivoted upwardly, as shown in Figures 43-45.

New independent Claim 65 is similar to Claim 56, as amended above, and further including the description that the engagement head engages the article by moving in a first direction (i.e.,

longitudinally, or front to back, as shown in Figures 42 and 43, and that the process robot moves in a second direction (laterally, or side-to-side) perpendicular to the first direction, as shown in Figures 49, 1, 13 and 14.

Turning to the prior art, Iwai, et al., '383 discloses a heat treatment apparatus which operates on wafers supplied within sealed containers. However, the wafers remain in a horizontal orientation at all times. Consequently, at a minimum, the following steps of claim 56 (and similar steps of new claim 65) are not disclosed by Iwai, et al.:

1.) pivoting the engagement head to move the article from a horizontal orientation into a vertical orientation.

2.) placing the article on a shelf with the article in a vertical orientation.

The secondary reference Kawabata '715 describes a wafer transfer apparatus used to transfer wafers between carriers. No processing steps are involved. The wafers begin and end in a horizontal orientation, with no processing in-between the reorienting.

In contrast to the claimed invention, Kawabata does not disclose engaging or disengaging wafers. In Kawabata, the carriers C1 and C2 are fixed to the table 11 of the carrier stage 10. Column 4, lines 10-12. Consequently, there can be no engagement or disengagement between the carriers C1 and C2 and the table 11. In addition, in Kawabata, there is no engagement or disengagement of wafers. The wafer maintainers 20A and 20B in Kawabata pivot upwardly against the wafers, to prevent the wafers from falling out of the carriers C1 and C2 when the table 11 is pivoted upwardly. Unlike the claimed operation of the engagement head, the Kawabata wafer

maintainers 20A and 20B do not move the wafers from a horizontal position to a vertical position, or vice versa, because they do not engage the wafers. They cannot pull on the wafers or change the orientation of the wafers. Rather, they can only push to hold the wafers in place as the table 11 is pivoted downwardly. Accordingly, Kawabata does not suggest any engagement step. Similarly, in Kawabata, there is no releasing of the wafers. Rather, there is merely contacting the wafers, to prevent them from falling. Neither the table 11 or the maintainers 20A and 20B suggest the claimed engagement head operation.

Table 11 of the carrier stage 10 is the only element in Kawabata that can move the wafers from a horizontal orientation into a vertical orientation. The wafer maintainers 20A and 20B cannot perform that function. Consequently, to the extent Kawabata discloses engaging an article with an engagement head (which applicant contends Kawabata does not disclose) elements 10 and 11 of Kawabata would correspond to the engagement head. However, with this reading of Kawabata, there is no engagement or releasing step, because apart from the one quarter turn downward re-orientation, the table 11 of the carrier stage 10 does not act on the wafers.

Accordingly, the combination of Iwai, et al. '383 and Kawabata '715 does not suggest the steps in lines 8-15 of amended claim 56.

Regarding new claim 65, the transfer robot moves in a direction perpendicular to the direction of movement of the engagement head. In Iwai, et al., the wafers appear to move in longitudinal and vertical directions, but not in a lateral direction, as shown by the arrows in Figures 1 and 4 (as opposed to air movement which apparently does move in a lateral direction). Figures 2, 13 and 18 show the carrier laterally aligned with the wafer boat 6 or 106, suggesting an absence of lateral movement. In contrast, referring to Figures 1 and 49 of the application, lateral movement of

the wafers to the processing stations 71-73 provides for a more compact design, requiring less costly floor space in a fabrication facility.

In view of the foregoing, it is submitted that the claims are patentable over the prior art. Accordingly, a Notice of Allowance is requested.

Respectfully submitted,

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CLAIM SHEETS MARKED UP TO SHOW CHANGES

Serial No. 09/575,551

Please cancel claims 1-55, and add new claims 56-65 as follows:

56. A method for processing a semiconductor wafer, data disk, semiconductor substrate and similar article requiring very low contaminant levels [workpiece] comprising the steps of:
- moving a sealed container, holding at least one [workpiece] article in a horizontal orientation, [through] to an interface port of a processing system;
- [moving the sealed container from the interface port to a docking station (X);]
- unsealing the container [at the docking station,] by removing a panel of the container, to provide access to the [workpiece] article in the container;
- engaging the [workpiece] article with an engagement head;
- [moving] pivoting the engagement head to move the [workpiece] article from a horizontal orientation into a vertical orientation;
- releasing the article from the engagement head;
- placing the [workpiece] article on a shelf with the [workpiece] article in a vertical orientation;
- lifting the [workpiece] article off of the shelf with a transfer robot;
- carrying the [workpiece] article on the robot to a process chamber;
- opening the process chamber;
- [placing] moving the [workpiece] article into the process chamber;

closing the process chamber; [and]
processing the [workpiece] article in the process chamber.

57. (Amended) The method of claim 56 where the interface port is part of [docking station is within an enclosure of] a processing system within an enclosure. [, further including the steps of opening the interface port in the enclosure before moving the sealed container through the interface port and then closing the interface port after the container had been moved through the interface port.]

58. Cancelled.

59. Cancelled.

60. Cancelled.

61. Cancelled.

62. The method of claim 56 wherein removing the panel of the container places the interior of the container in fluid communication with the workspace within the enclosure.

63. Cancelled.

64. (New) The method of claim 56 wherein the engagement head is pivoted upwardly to move the article from the horizontal to vertical orientation.

65. (New) A method for processing a semiconductor wafer, data disk, semiconductor substrate and similar articles requiring very low contaminant levels, comprising the steps of:

moving a sealed container holding at least one article in a horizontal orientation, to an interface port of a processing system;

unsealing the container, to provide access to the article in the container;

engaging the article with an engagement head by moving the engagement head in a first direction;

pivoting the engagement head, to move the article from a horizontal orientation into a vertical orientation;

releasing the article from the engagement head and placing the article on a shelf with the article in a vertical orientation;

lifting the article off of the shelf with a transfer robot;

carrying the article on the transfer robot to a process chamber by moving the transfer robot in a second direction, perpendicular to the first direction;

opening the process chamber;

placing the article into the process chamber;
closing the process chamber; and
processing the article in the process chamber.